

## **Supplemental Material**

Supplementary-Table 1. Measures of HRV and their inter-correlations at baseline in the Cardiovascular Health Study.

HRV Indices											
	Mean (SD)	SDNN	rMSSD	SDNNIDX	NLF	NHF	VLF	ULF	LF/HF	Poincare Ratio	DFA1
<b>24-hour Holter indices *</b>											
SDNN, ms	121.6(34.7)	...									
rMSSD, ms	26.5(17.0)	0.44	...								
SDNNIDX, ms	44.1(15.1)	0.65	0.76	...							
NLF, %	68.5(6.0)	0.01	-0.14	0.07	...						
NHF, %	19.0(4.7)	0.008	0.33	0.06	-0.85	...					
VLF, ms <sup>2</sup>	2288(38801)	0.67	0.59	0.93	0.08	0.02	...				
ULF, 1000 ms <sup>2</sup>	14.5(27.1)	0.98	0.35	0.54	0.02	-0.01	0.58	...			
LF/HF ratio	1.29 (0.56)	0.07	-0.56	-0.07	0.95	-0.97	0.14	0.11	...		
Poincare Ratio‡	0.27(0.10)	-0.11	0.57	0.002	-0.43	0.61	-0.19	-0.13	-0.83	...	
DFA1‡	1.04(0.18)	0.11	-0.49	0.05	0.77	-0.81	0.24	0.12	0.92	-0.91	...

\*24-hour HRV indices capture resting, activity, sleep, and circadian influences.

Values are Spearman correlation coefficients (P<0.01 for all correlations >0.1). All measures were derived from 24-hour Holter recordings (n=1219).

Supplementary-Table 2. Associations of changes in walking habits with concurrent changes in HRV, assessed using 24-hour Holter, among older US adults.

Walking distance, blocks/wk *						
	Q1 (n=158)	Q2 (n=164)	Q3 (n=141)	Q4 (n=134)	Q5 (n=153)	
<b>Time-domain indices</b>						
<b>SDNN, ms</b>	-5.3 (12.1)	-5.0 (12.9)	-4.4 (12.7)	-2.1 (12.8)	-3.1 (13.0)	0.13
<b>SDNNIDX, ms</b>	-1.4 (3.6)	-0.6 (4.2)	-2.1 (3.5)	1.6 (3.5)	-0.8 (4.0)	0.59
<b>rMSSD, ms**</b>	0.3 (2.0)	0.8 (2.2)	-2.4 (2.3)	1.1 (2.6)	0.5 (2.4)	0.49
<b>Frequency-domain indices</b>						
<b>NLF, %**</b>	-2.7 (1.6)	-2.5 (1.6)	-1.2 (1.8)	-2.9 (1.4)	-2.1 (1.9)	0.71
<b>NHF, %**</b>	1.4 (1.7)	0.7 (1.8)	-0.5 (1.8)	1.3 (1.6)	0.6 (1.8)	0.74
<b>VLF, 1000ms<sup>2</sup></b>	1.2 (11.5)	-2.2 (15.5)	0.5 (13.7)	-9.1 (13.4)	-1.4 (13.2)	0.65
<b>ULF, 1000 ms<sup>2</sup></b>	0.4 (9.4)	-10.2 (9.1)	0.9 (10.0)	-6.6 (105.8)	-0.3 (120.0)	0.86
<b>LF/HF** ratio</b>	-0.3 (0.6)	-0.3 (0.5)	0.0 (0.7)	-0.4 (0.6)	-0.2 (0.6)	0.42
<b>Nonlinear indices</b>						
<b>Poincare ratio (SD12)</b>	0.04 (0.02)	0.02 (0.02)	0.01 (0.03)	0.03 (0.03)	0.03 (0.03)	0.83
<b>DFA1</b>	0.06 (0.05)	0.08 (0.05)	0.10 (0.05)	0.08 (0.04)	0.07 (0.05)	0.39

Table shows changes in walking distance and concurrent changes in HRV indices. Values are mean (SD), adjusted for age (years), sex (male, female), race (white, nonwhite), enrollment center (4 sites), education (<high school, high school, college), income ( $\leq \$25,000$ ,  $> \$25,000$ ), smoking (never, former, current), alcohol (<1 drink/week, 1-2 drinks/week, 3-7 drinks/week, 8-14 drinks/week,  $> 14$  drinks/week), and consumption of fish (<1 serving/month, 1-3 servings/month, 1-2 servings/week, 3-4 servings/week, 5+ servings/week), dietary fiber (quintiles, g/day), and total calories (quintiles, kcal/day).

Numbers are shown for time-domain measures (n=620); slightly fewer individuals (n=555) had frequency-domain and nonlinear measures.

\*\* rMSSD, NLF, NHF and LF/HF ratio were evaluated among individuals with lower erratic HRV (baseline DFA>median(1.044) and baseline DFA>median(1.127) ; n=285).

Supplementary-Table 3. Associations of changes in leisure-time activity with concurrent changes in HRV, assessed using 24-hour Holter, among older US adults.

	Quintiles of Leisure-Time Activity, kcal/wk*					P for Trend
	Q1 (n=170)	Q2 (n=135)	Q3 (n=98)	Q4 (n=195)	Q5 (n=147)	
<b>Time-domain indices</b>						
<b>SDNN, ms</b>	-3.9 (12.8)	-4.7 (11.8)	-0.8 (11.5)	-5.0 (12.1)	-4.1 (12.5)	0.44
<b>SDNNIDX, ms</b>	0.5 (3.9)	-0.8 (4.3)	-1.0 (3.1)	-0.9 (3.5)	-1.0 (3.4)	0.37
<b>rMSSD, ms**</b>	0.5 (2.3)	1.1 (2.5)	0.7 (2.9)	-1.1 (3.1)	0.8 (2.8)	0.13
<b>Frequency-domain indices</b>						
<b>NLF, %**</b>	-2.8 (1.7)	-1.7 (1.6)	-2.7 (1.7)	-1.8 (1.7)	-2.3 (1.6)	0.97
<b>NHF, %**</b>	1.2 (1.7)	0.3 (1.6)	1.8 (1.8)	-0.2 (1.8)	0.5 (1.8)	0.48
<b>VLF, 1000ms<sup>2</sup></b>	-2.3 (13.8)	1.6 (13.7)	0.09 (15.0)	-8.8 (14.7)	3.0 (15.2)	0.10
<b>ULF, 1000 ms<sup>2</sup></b>	-0.4 (10.2)	0.7 (11.2)	0.8 (11.6)	-6.7 (10.1)	-0.3 (12.3)	0.20
<b>LF/HF ** ratio</b>	-0.5 (0.6)	-0.1 (0.5)	-0.5 (0.5)	0.0 (0.5)	-0.3 (0.5)	0.33
<b>Nonlinear indices</b>						
<b>Poincare ratio (SD12)</b>	0.03 (0.02)	0.04 (0.03)	0.04 (0.03)	0.02 (0.03)	0.02 (0.03)	0.26
<b>DFA1</b>	0.07 (0.05)	0.07 (0.04)	0.08 (0.05)	0.08 (0.05)	0.09 (0.05)	0.64

Table shows changes in leisure-time activity and concurrent changes in HRV indices. Values are mean (SD), adjusted for age (years), sex (male, female), race (white, nonwhite), enrollment center (4 sites), education (<high school, high school, college), income ( $\leq \$25,000$ ,  $> \$25,000$ ), smoking (never, former, current), alcohol (<1 drink/week, 1-2 drinks/week, 3-7 drinks/week, 8-14 drinks/week, >14 drinks/week), and consumption of fish (<1 serving/month, 1-3 servings/month, 1-2 servings/week, 3-4 servings/week, 5+ servings/week), dietary fiber (quintiles, g/day), and total calories (quintiles, kcal/day).

Numbers are shown for time-domain measures (n=624); slightly fewer individuals (n=559) had frequency-domain and nonlinear measures.

\*\* rMSSD, NLF and NHF were evaluated among individuals with lower erratic HRV (baseline DFA>median(1.044) and baseline DFA>median(1.127) ; n=285).

Supplementary-Table 4. Cross-sectional associations at baseline of leisure-time activity, exercise intensity, and walking habits with HRV, assessed using 24-hour Holter, among 1219 older US adults.

	Quintiles of Leisure-Time Activity, kcal/wk					Categories of Exercise Intensity					P for Trend
	I: <150 (n=244)	II: 150-540 (n=253)	III: 540-1100 (n=235)	IV: 1100-2205 (n=244)	V: >2205 (n=243)	P for Trend	None (n=68)	Low (n=568)	Medium (n=446)	High (n=137)	
<b>Time-domain indices</b>											
SDNN, ms	114.0 (7.1)	111.7 (7.6)	115.6 (7.5)	119.3 (7.4)	125.2 (8.2)	0.001	114.5 (7.2)	117.8 (8.1)	114.3 (8.1)	123.6 (8.3)	0.83
SDNNIDX, ms	40.7 (3.9)	40.4 (3.7)	41.2 (3.8)	43.1 (3.9)	44.5 (3.9)	0.13	39.0 (3.9)	42.2 (4.1)	41.4 (4.1)	44.4 (4.2)	0.78
rMSSD**, ms	18.1 (1.6)	18.7 (1.7)	18.5 (1.8)	19.3 (1.7)	20.1 (1.9)	0.18	16.4 (1.5)	18.5 (1.6)	19.1 (1.8)	17.8 (1.6)	0.97
<b>Frequency-domain indices</b>											
NLF**, %	68.8 (1.7)	67.9 (1.7)	68.5 (1.8)	68.3 (1.7)	68.5 (1.7)	0.30	70.5 (1.7)	69.2 (1.7)	69.3 (1.7)	69.2 (1.7)	0.47
NHF**, %	19.0 (1.5)	19.5 (1.4)	18.8 (1.5)	19.0 (1.5)	18.9 (1.5)	0.70	17.7 (1.2)	18.2 (1.3)	18.4 (1.4)	18.0 (1.4)	0.60
VLF, ms <sup>2</sup>	890 (205)	913 (201)	965 (218)	1065 (229)	1144 (234)	0.01	839 (200)	997 (239)	977 (237)	1141 (251)	0.46
ULF, ms <sup>2</sup>	11.1 (1.5)	10.8 (1.5)	11.6 (1.5)	12.2 (1.6)	13.4 (1.7)	<0.0001	11.3 (1.4)	11.9 (1.7)	11.1 (1.5)	13.1 (1.7)	0.81
LF/HF** ratio	5.1 (0.5)	5.1 (0.5)	5.3 (0.5)	5.2 (0.5)	5.2 (0.5)	0.83	5.4 (0.5)	5.1 (0.5)	5.2 (0.5)	5.3 (0.5)	0.97
<b>Nonlinear indices</b>											
Poincare ratio (SD12)	0.27 (0.03)	0.26 (0.02)	0.25 (0.02)	0.25 (0.03)	0.24 (0.02)	0.03	0.28 (0.02)	0.26 (0.02)	0.25 (0.02)	0.24 (0.03)	0.04
DFA1	1.01 (0.06)	1.03 (0.06)	1.07 (0.06)	1.06 (0.06)	1.08 (0.06)	0.02	0.99 (0.06)	1.03 (0.06)	1.05 (0.06)	1.08 (0.06)	0.02

Walking distance, blocks/wk					Walking pace, mph				
0-6 (n=266)	7-12 (n=233)	13-30 (n=239)	31-75 (n=238)	≥75 (n=243)	P For Trend	< 2 mph (n=287)	2-3mph (n=521)	>3 mph (n=411)	P For Trend
<b>Time-domain indices</b>									
SDNN, ms	112.6 (7.4)	113.9 (7.8)	119.1 (8.4)	117.2 (7.4)	123.0 (7.7)	0.005	113.8 (7.9)	115.9 (7.9)	120.6 (7.8)
SDNNIDX, ms	39.4 (3.7)	41.4 (3.9)	43.0 (4.0)	42.9 (3.8)	43.8 (3.7)	0.02	39.6 (3.8)	42.0 (3.9)	43.6 (4.1)
rMSSD**, ms	18.1 (1.7)	18.7 (1.8)	19.3 (1.9)	19.3 (1.8)	19.5 (1.8)	0.25	18.8 (1.7)	18.6 (1.8)	19.4 (1.9)
<b>Frequency-domain indices</b>									
NLF**, %	67.4 (1.8)	68.6 (1.6)	68.3 (1.7)	69.0 (1.6)	68.7 (1.6)	0.18	68.0 (1.8)	68.3 (1.7)	68.7 (1.6)
NHF**, %	19.7 (1.5)	19.1 (1.4)	19.1 (1.5)	18.8 (1.6)	18.6 (1.5)	0.09	19.1 (1.5)	19.1 (1.5)	18.9 (1.5)
VLF, ms <sup>2</sup>	875.0(204.5)	927.4(217.0)	1046.8(241.0)	1030.0(219.8)	1110.7(224.6)	0.02	892.4(213.8)	994.2(224.2)	1065.4(240.5)
ULF, 1000 ms <sup>2</sup>	11.2 (1.5)	11.1 (1.5)	12.1 (1.7)	11.6 (1.5)	13.0 (1.7)	0.01	11.3 (1.6)	11.5 (1.5)	12.4 (1.6)
LF/HF** ratio	5.0 (0.5)	5.2 (0.4)	5.2 (0.5)	5.3 (0.5)	5.2 (0.5)	0.27	5.2(0.5)	5.1 (0.5)	5.3 (0.5)
<b>Nonlinear indices</b>									
Poincare ratio (SD12)	0.26 (0.03)	0.26 (0.02)	0.25 (0.02)	0.25 (0.03)	0.24 (0.02)	0.04	0.26 (0.03)	0.25 (0.02)	0.24 (0.03)
DFA1	1.01 (0.06)	1.03 (0.06)	1.06 (0.06)	1.06 (0.06)	1.08 (0.06)	0.01	1.02 (0.06)	1.04 (0.06)	1.07 (0.06)

Measures (except NLF, NHF, and DFA1) were log-transformed for analysis and then exponentiated. Values are mean (SD), adjusted for age (years), sex (male, female), race (white, nonwhite), enrollment center (4 sites), education (<high school, high school, college), income ( $\leq \$25,000$ ,  $> \$25,000$ ), smoking (never, former, current), alcohol (<1 drink/week, 1-2 drinks/week, 3-7 drinks/week, 8-14 drinks/week, >14 drinks/week), and consumption of fish (<1 serving/month, 1-3 servings/month, 1-2 servings/week, 3-4 servings/week, 5+ servings/week), dietary fiber (quintiles, g/day), and total calories (quintiles, kcal/day).

For values log transformed we report the upper SD.

Numbers are shown for time-domain measures (n=1219); slightly fewer individuals (n=1150) had frequency-domain and nonlinear measures.

\*\* rMSSD, NLF, NHF and LF/HF ratio were evaluated among individuals with lower erratic HRV (DFA>median(1.044); n=675).